VegScape:
A NASS Web Mapping Service Based U.S. Crop Condition Monitoring System

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National Agricultural Statistics Service

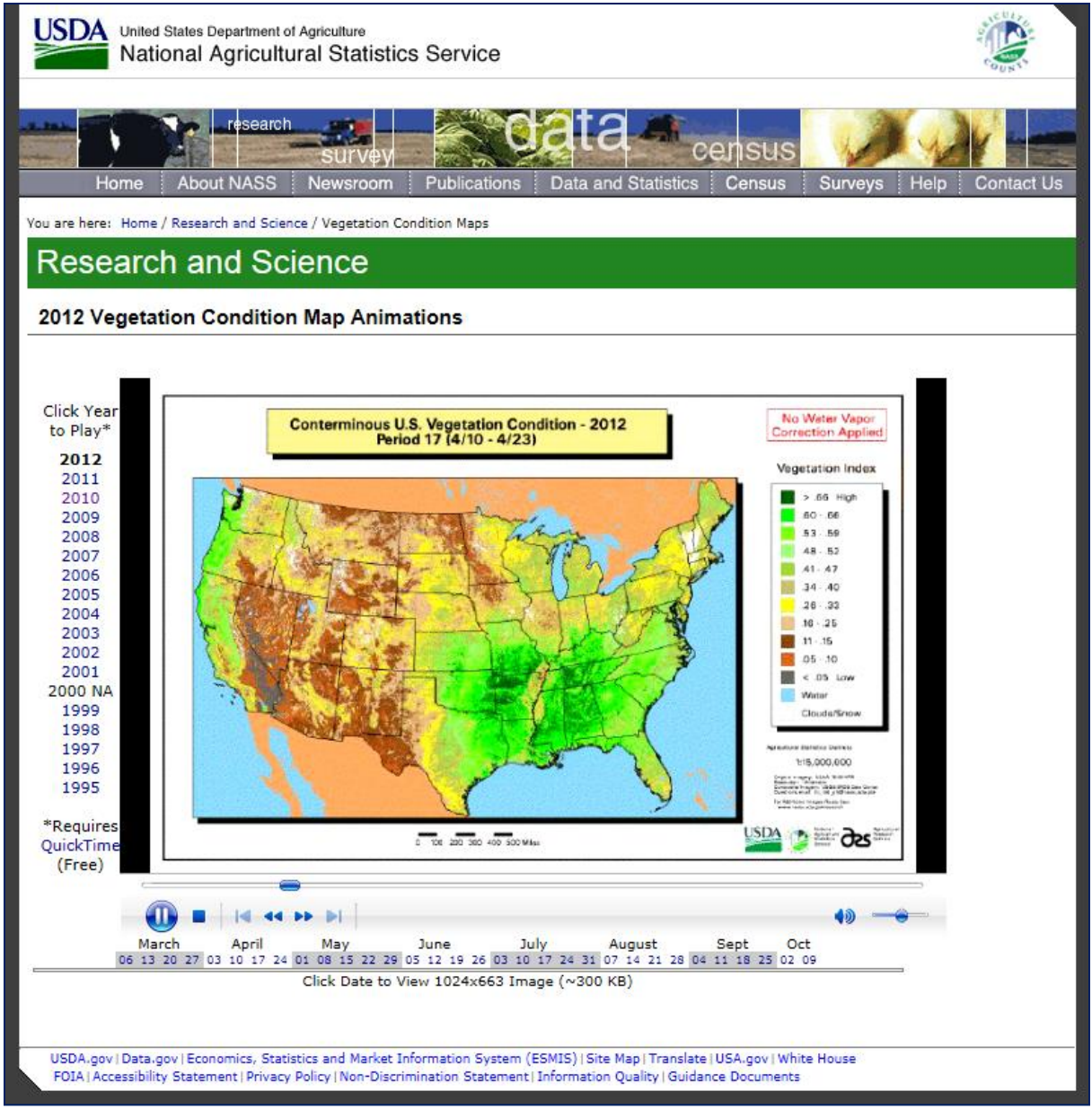
Purpose of VegScape

- On-line satellite-based U.S. crop condition vegetation assessment and monitoring
- Improve objectivity, robustness, quantification, and defensibility of nationwide crop condition monitoring program
- Provide tools for data exploration and visualization
- Publically disseminate geospatial vegetation condition at *daily, weekly,* and *biweekly* time periods
- Supports ethos of data democratization
  - free and open access to digital geospatial data layers
  - open geospatial standards
  - supporting transparent and collaborative government initiatives

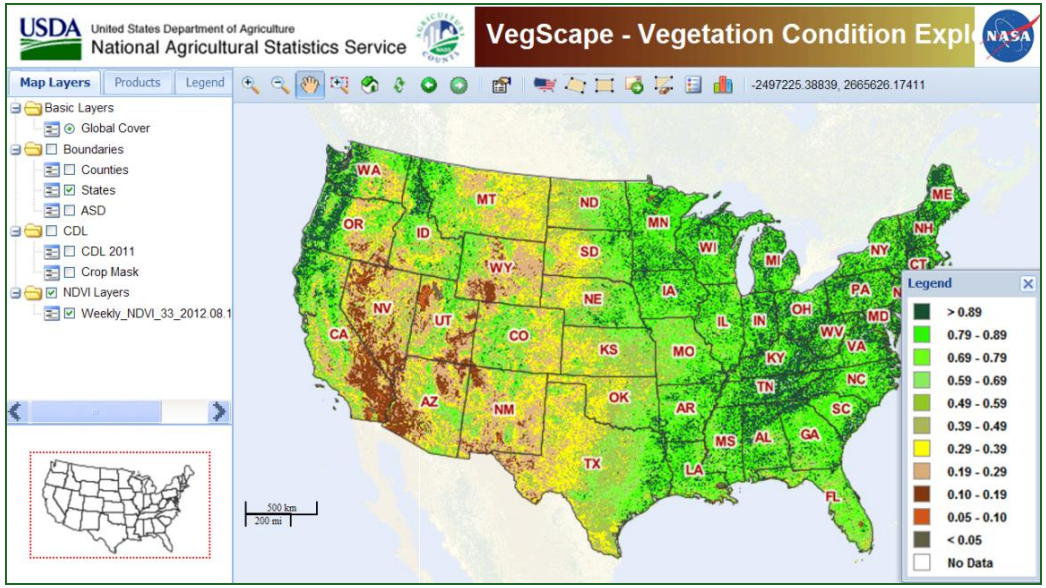
VegScape Objective

- Develop an operational National Crop Condition Monitoring System
- Use 250m MODIS daily surface reflectance data (MOD09GQ) to produce crop vegetation condition data products that are complementary to existing NASS crop condition products
- Improve NASS vegetation condition monitoring spatial and temporal resolutions

- 1995-2012
- NDVI Vegetative Condition
- Static Maps
- Based on AVHRR sensor (1 km spatial resolution)



- 2013
- **VegScape** – web service
- Multiple vegetation indices
- Interactive web mapping: navigate, download, etc.
- MODIS sensor: daily repeat, 250m resolution (~15 acres /6.25 hectares)
- Composites: daily, weekly, bi-weekly



Built on CropScape framework/architecture

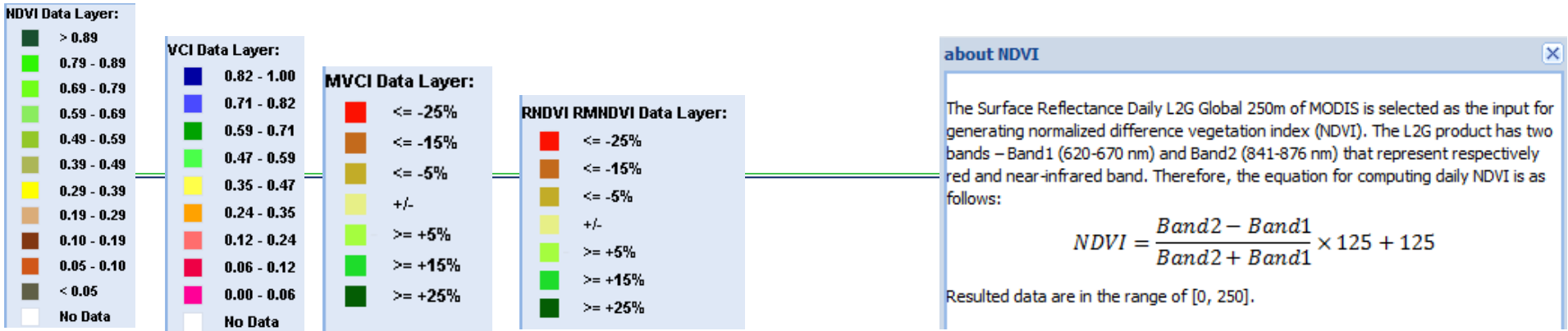
- Web-based interactive mapping
- Derive daily/weekly/biweekly composites
- Automated updates
- Online navigation, zooming, panning, downloading
- Hosted/maintained by GMU/Center for Spatial Information Science and Systems

Vegetation Indices

- The Normalized Difference Vegetation Index (NDVI) is used to measure and monitor plant growth, vegetative cover, and biomass production

- NDVI values range from 0 to 1, where higher values indicate stronger plant vigor and high chlorophyll content
  - Lower values indicate low vegetative content/plant heartiness

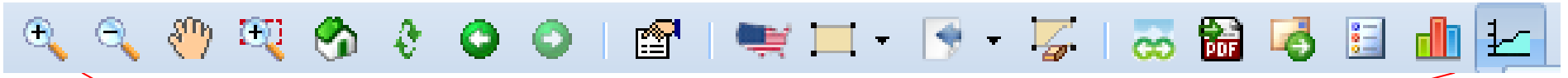
- Additional derivative vegetation indices can be displayed: Vegetative Condition Index; Ratio VCI; Ratio Median VCI; Mean VCI



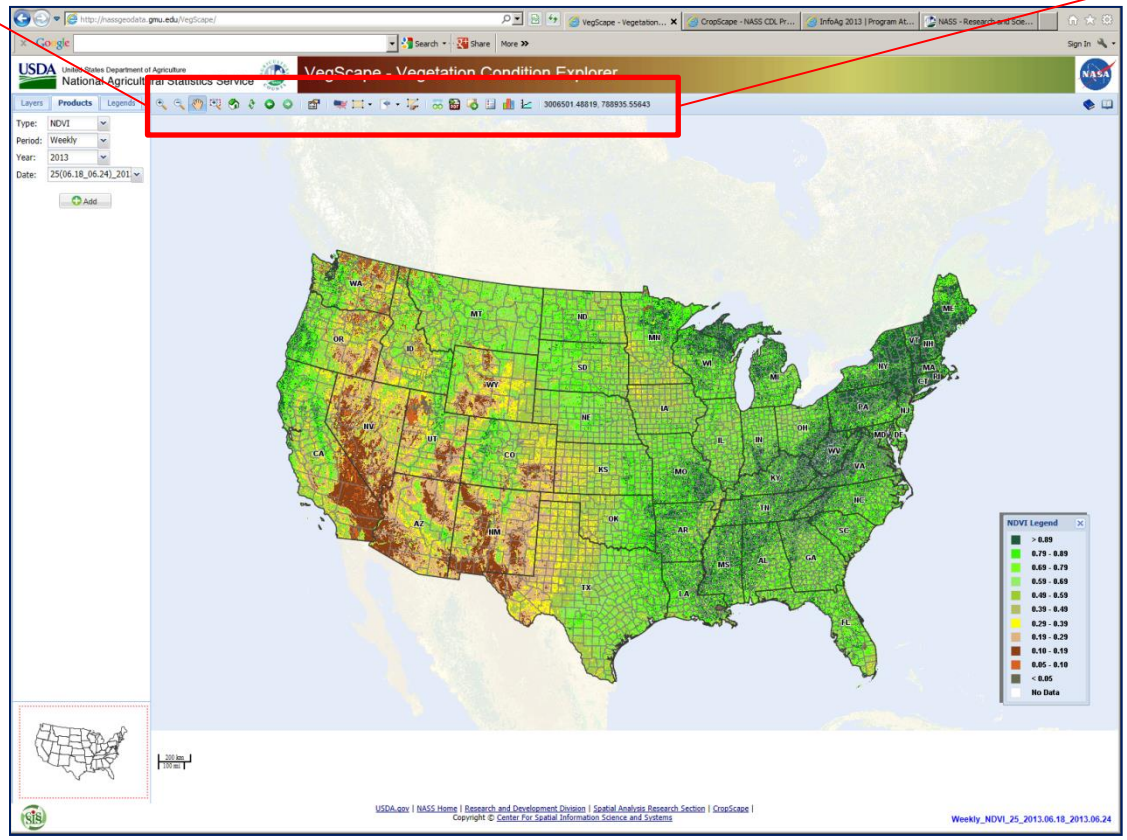
Vegetation Indices

- **NDVI** – Normalized Difference Vegetation Index
  NDVI = (IR - Red) / (IR + Red) = Shows greeness
  Healthy vegetation has high NDVI ratio values (1.0 max)
  low red light & high near-infrared reflectance values
- **RVCI** -NDVI change ratio to previous year
- **RMVCI** - NDVI change ratio to median
- **VCI** - Relative NDVI change with respect to minimum historical (referenced) NDVI value
- **MVCI** - Mean referenced VCI (vegetation condition index)

Zoom in
Zoom out
Pan
Drag zoom
Home
Refresh
Previous view
Next view
Identify pixel value
Define state/county AOI
Define rectangle AOI
Import AOI
Clear AOI
Swipe layer
Create PDF map
Download AOI
Show/hide legend
Statistics
NDVI Profile



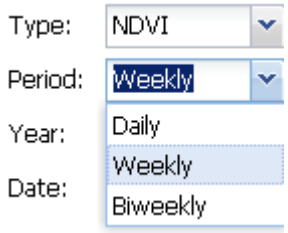
VegScape GUI



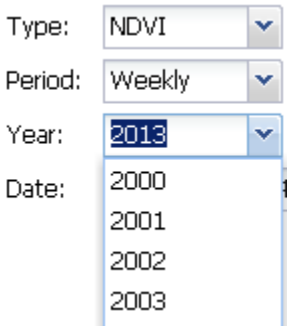
Load VegScape Indices

1) Select vegetative index

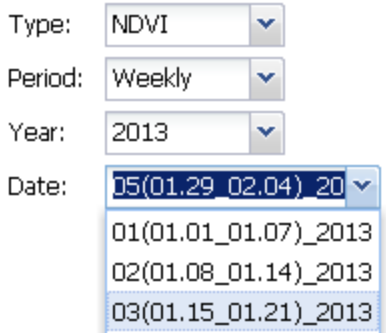
2) Time period



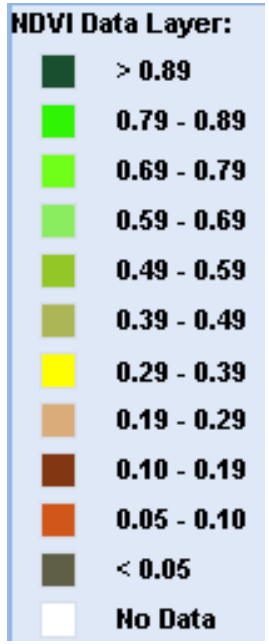
3) Year

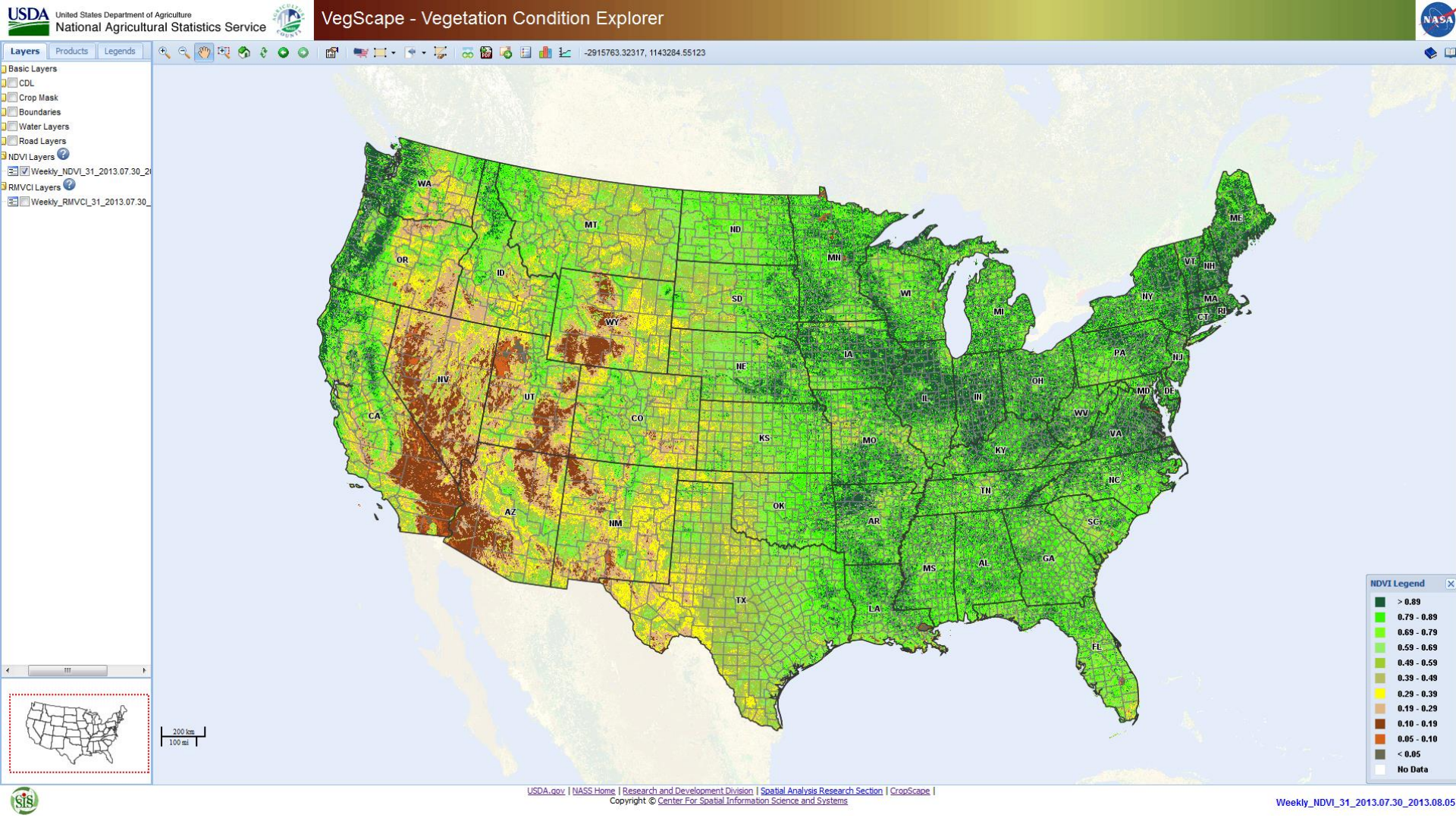


4) Date

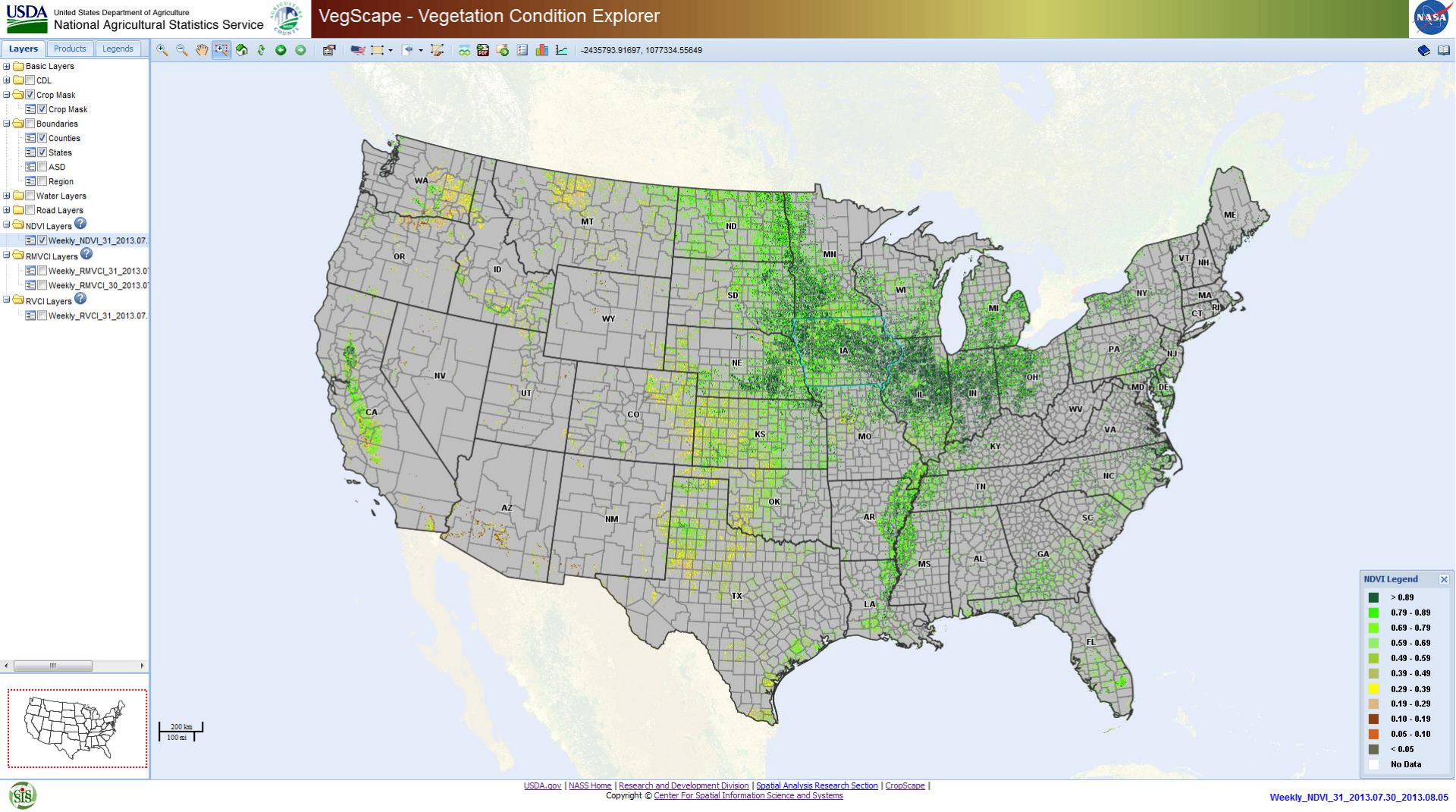


5) Add

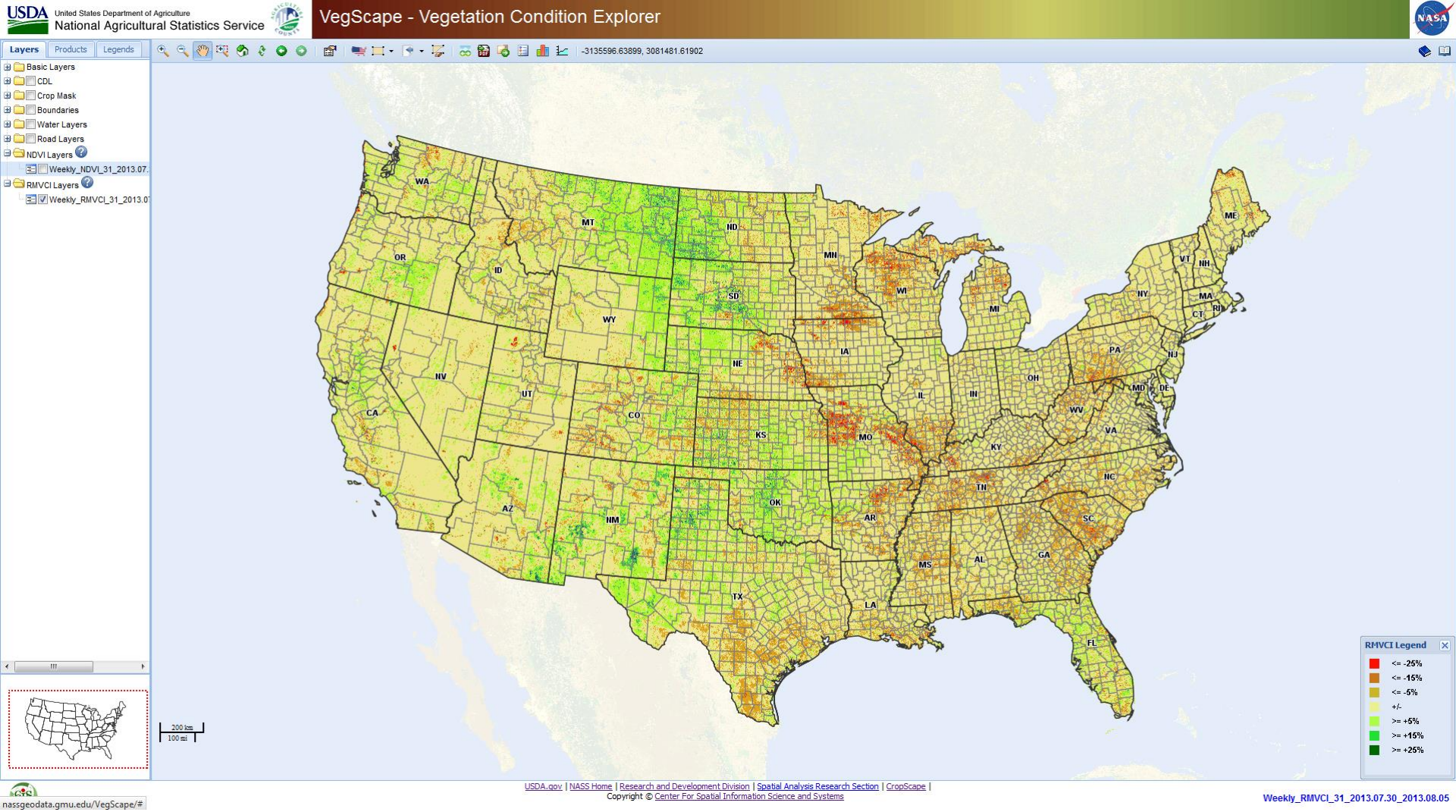




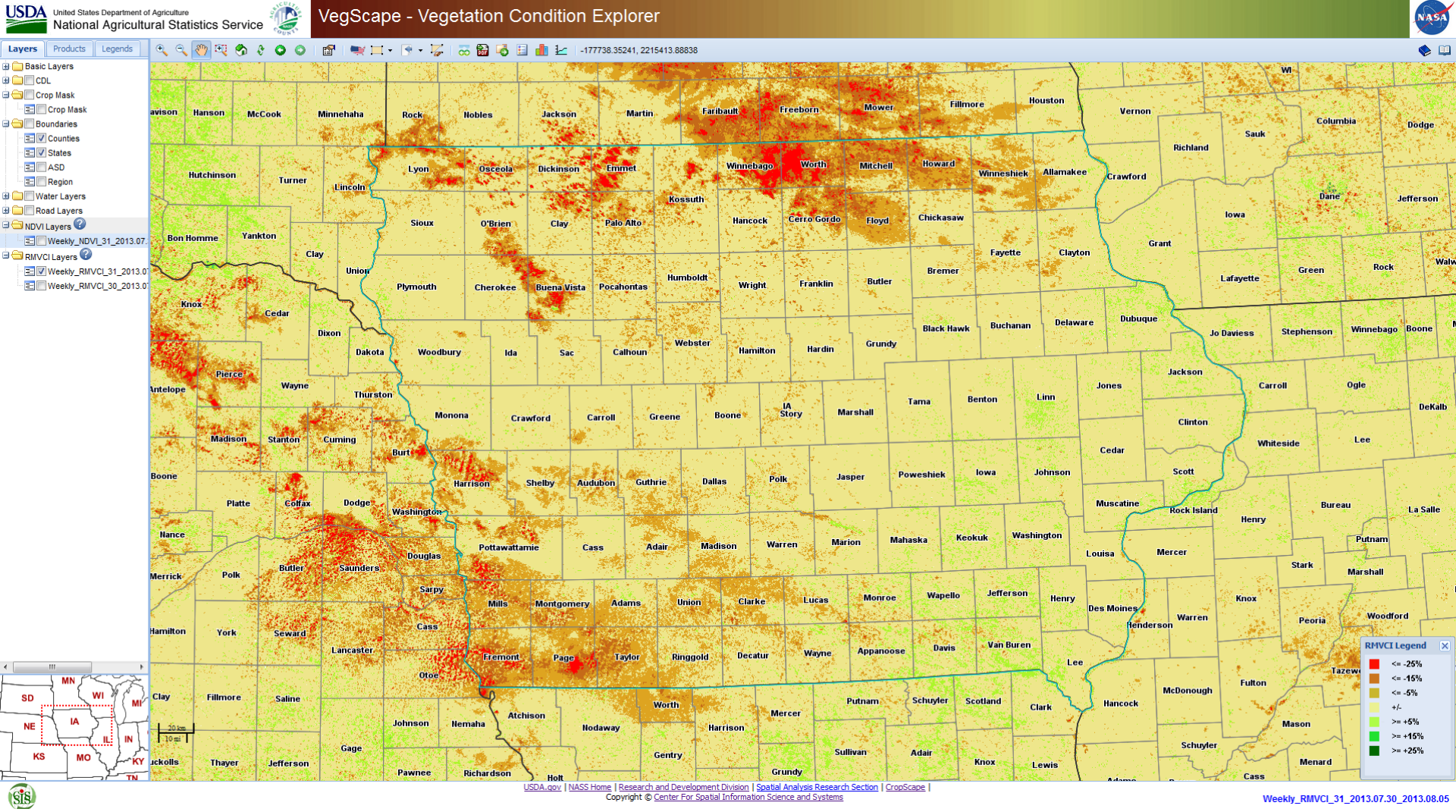
Most recent weekly NDVI image: 07/30/13 – 08/05/13



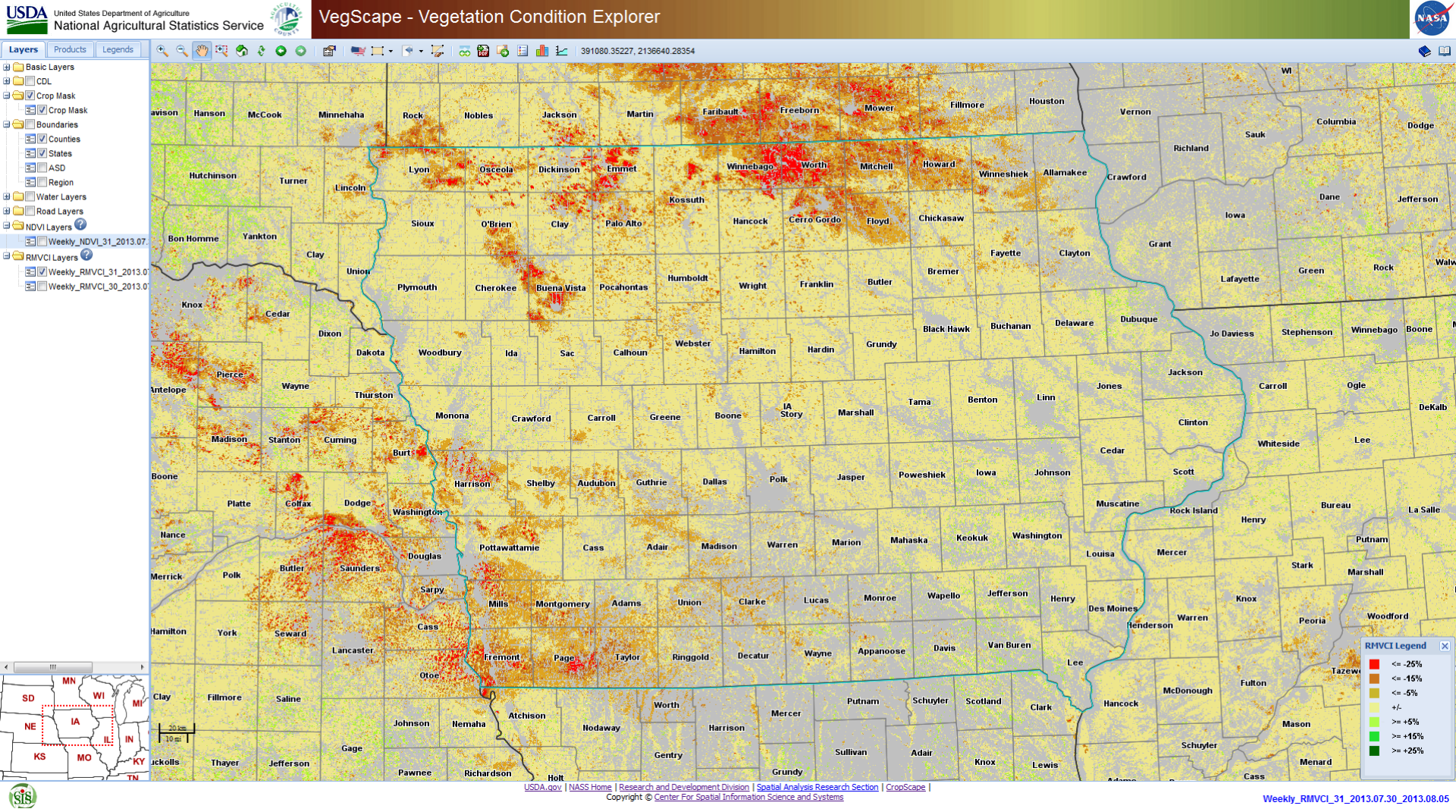
Most recent weekly NDVI image: 07/30/13 – 08/05/13
CDL Crop Mask applied



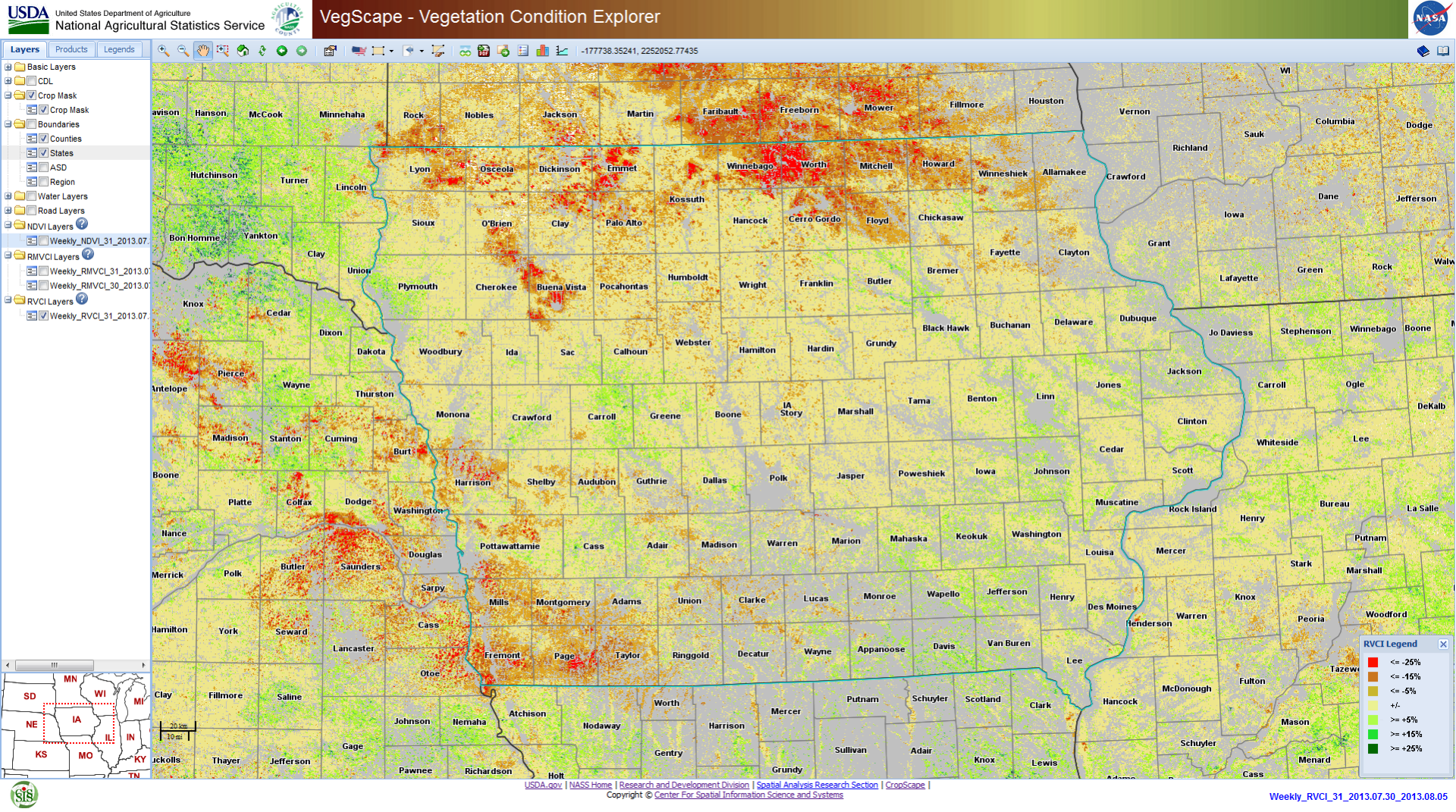
Ratio Median NDVI image: 07/30/13 – 08/05/13



Ratio Median NDVI zoom: 07/30/13 – 08/05/13



Ratio Median NDVI zoom: 07/30/13 – 08/05/13
CDL Crop Mask applied



Ratio to last year NDVI: 07/30/13 – 08/05/13
CDL Crop Mask applied

USDA

Crops & Weather

National Agricultural Statistics Service
Iowa Field Office

USDA National Agricultural Statistical Service, Iowa Field Office • 210 Walnut, Room 833 • Des Moines, Iowa 50309-2195
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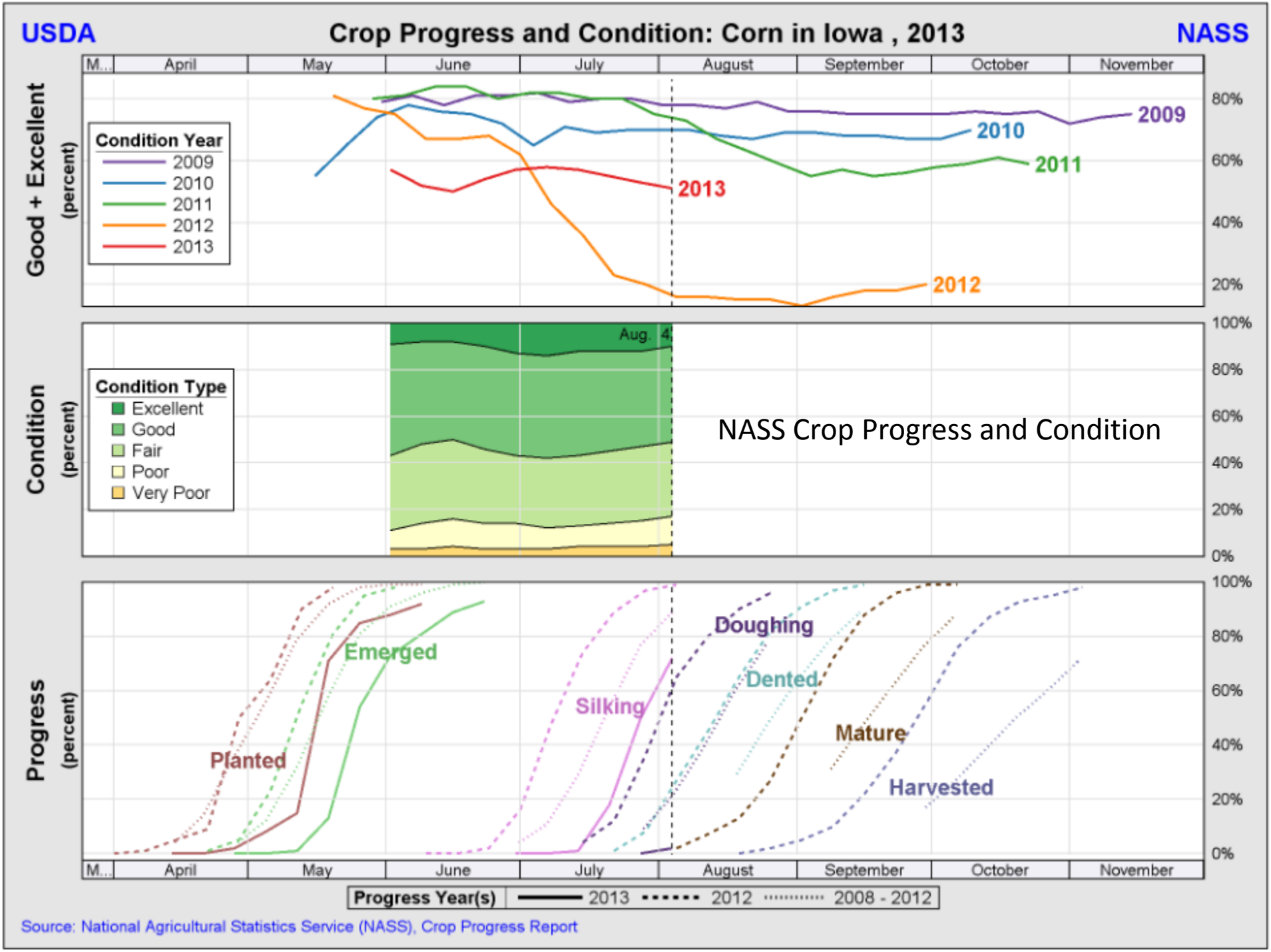
In Cooperation with the Iowa Department of Agriculture and Land Stewardship

Issued August 5, 2013 Vol 13-22 For the week ending August 4, 2013

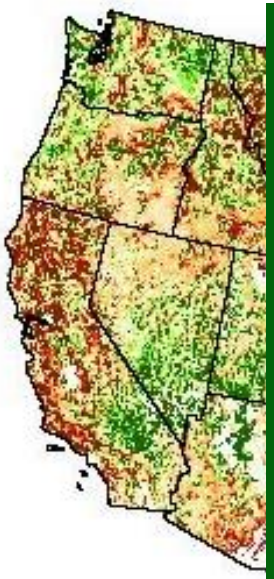
Media Contact: Greg Thessen

Eighty-eight percent of the corn crop has tasseled, trailing the five-year average of 96 percent. Seventy-two percent of the corn crop was silking, well behind last year's 99 percent and the normal 89 percent. Nineteen percent of the corn crop has reached the milk stage, and some of the earliest planted corn has reached the dough stage. Corn condition declined slightly from the previous week, and was rated at 5 percent very poor, 12 percent poor, 32 percent fair, 41 percent good and 10 percent excellent. Seventy-nine percent of the soybean crop was blooming, behind last year's 96 percent and the five-year average of 92 percent. Pods were being set on 35 percent of the soybean crop, well behind last year's 74 percent and the normal 65 percent. Soybean condition declined slightly from last week and was rated 4 percent very poor, 10 percent poor, 34 percent fair, 42 percent good and 10 percent excellent. Seventy-seven percent of the oat crop has been harvested, only 1 percentage point behind normal.


USDA
Crop Progress and Condition: Corn in Iowa , 2013
NASS
Good + Excellent (percent)
Condition Year
2009
2010
2011
2012
2013
M...
April
May
June
July
August
September
October
November
80%
60%
40%
20%
Condition (percent)
Condition Type
Excellent
Good
Fair
Poor
Very Poor
Aug. 4
100%
80%
60%
40%
20%
0%
NASS Crop Progress and Condition
Progress (percent)
Planted
Emerged
Silking
Doughing
Dented
Mature
Harvested
Progress Year(s)
2013
2012
2008 - 2012
Source: National Agricultural Statistics Service (NASS), Crop Progress Report

Evaporative Stress Index

1 month composite ending August 7, 2013



-2σ<

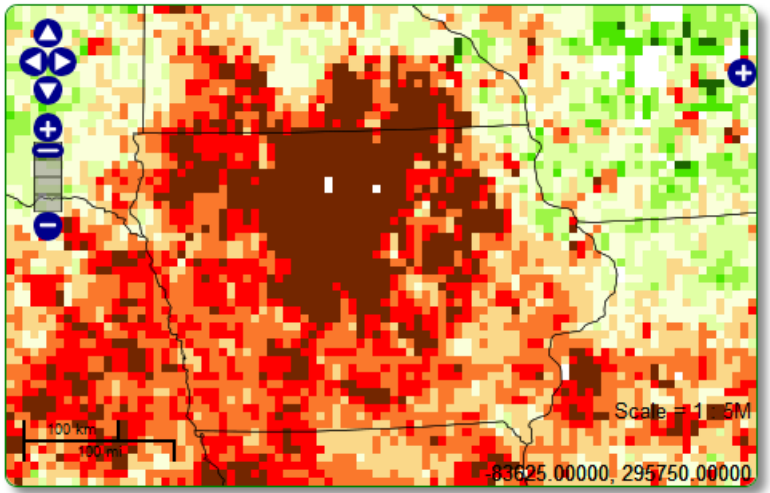
ESI Archive - CONUS

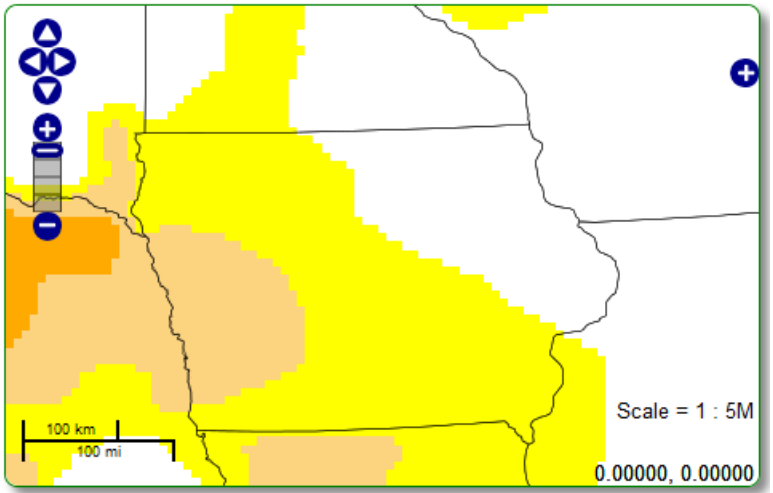
USDA-ARS HRSL

Hydrology & Remote Sensing Lab
Beltsville, Maryland, USA

Index: ESI | Timescale: 1 Month | Aug 7 | 2013

Index: USDM | Timescale: Weekly | Aug 5 | 2013





Download | Popup | Download | Popup

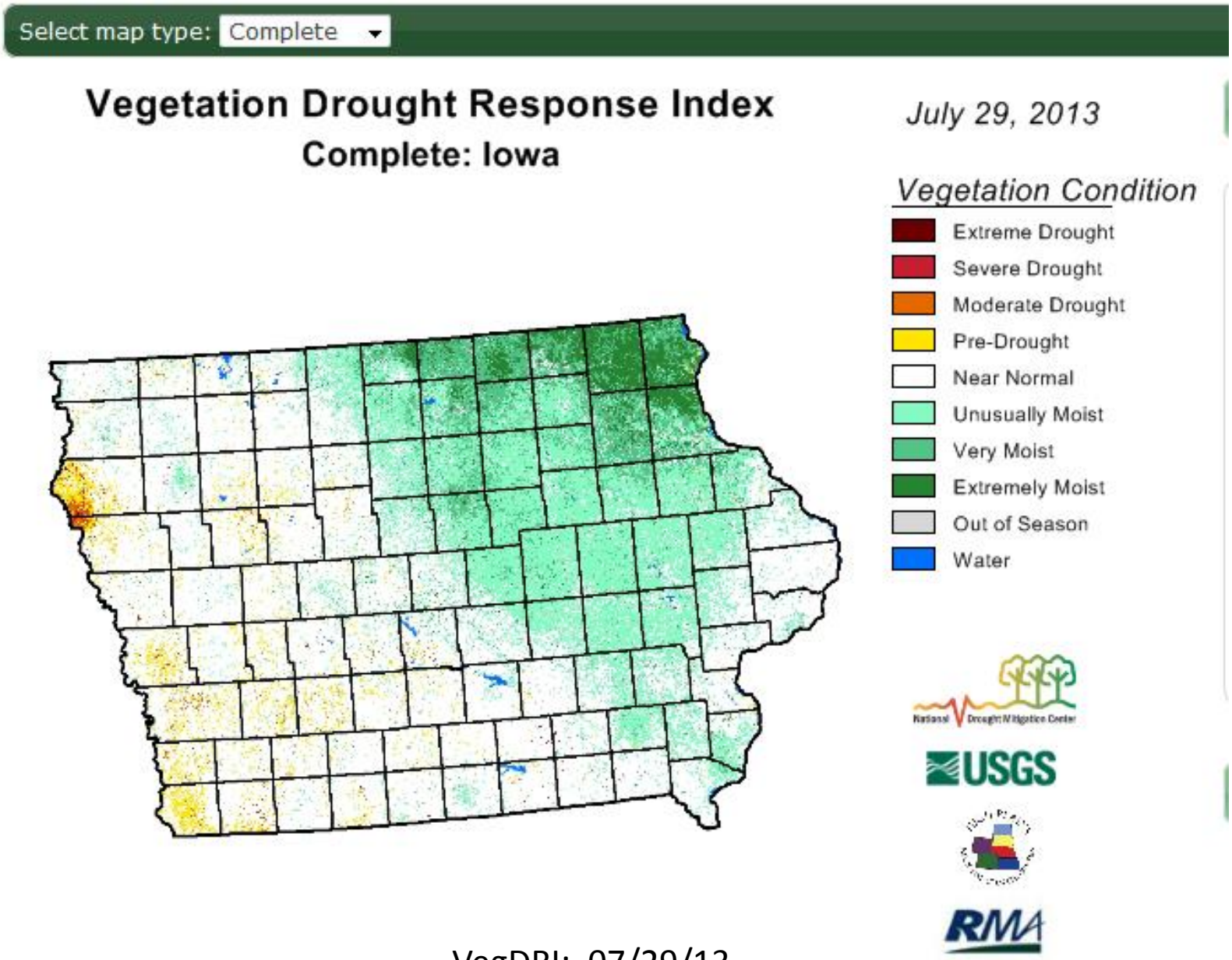
Standardized ET/PET anomalies

-2σ < -1σ 0 +1σ > +2σ

U.S. Drought Monitor Drought Severity

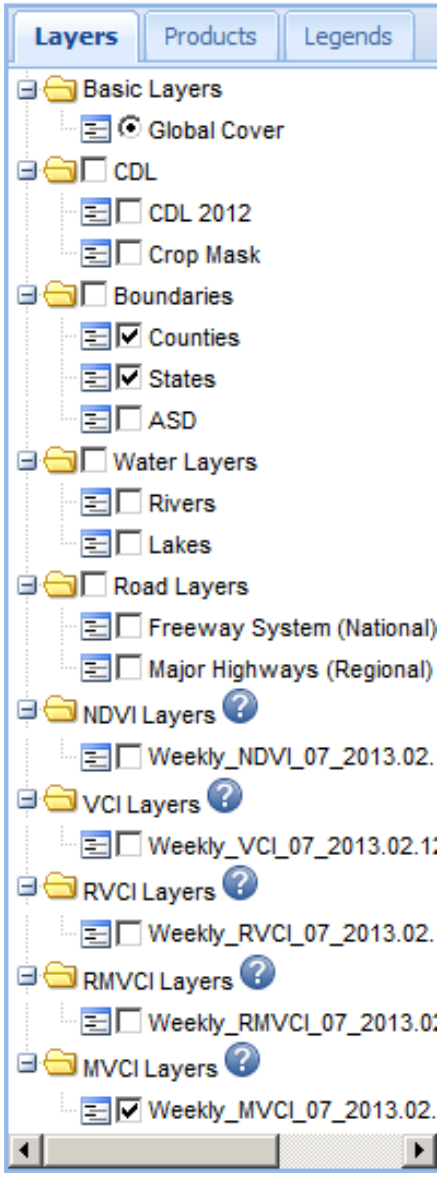
D0 D1 D2 D3 D4

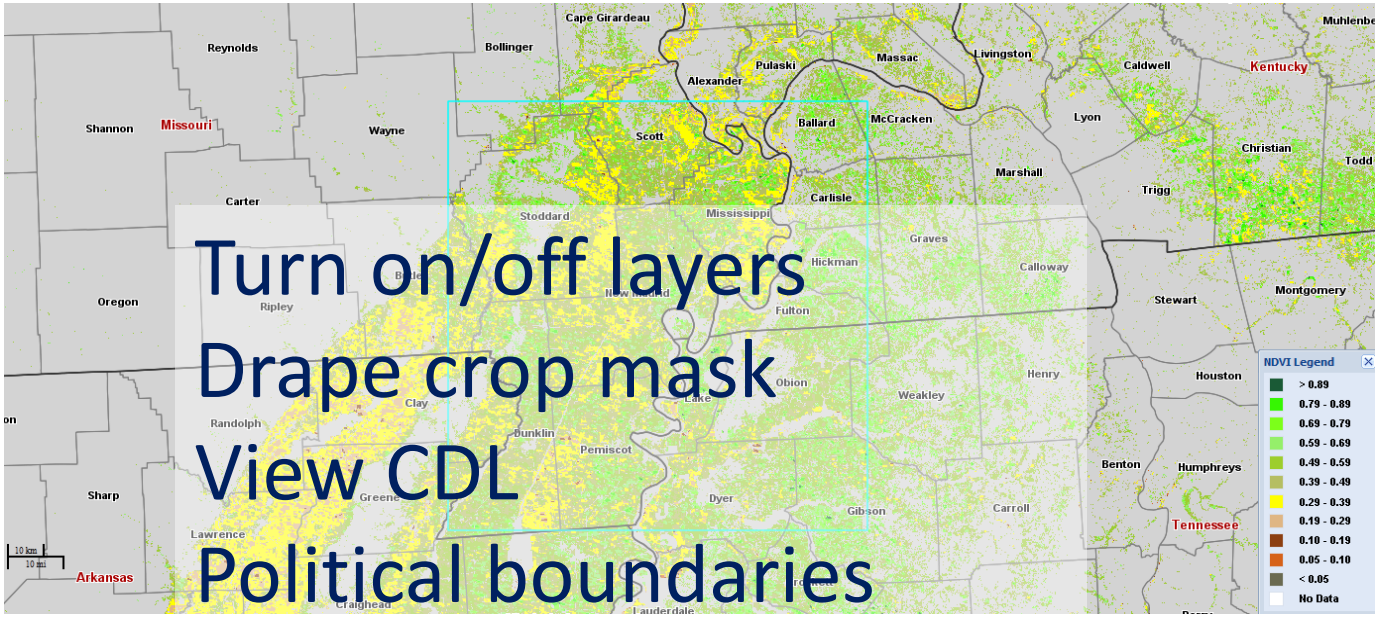
View in Static Mode

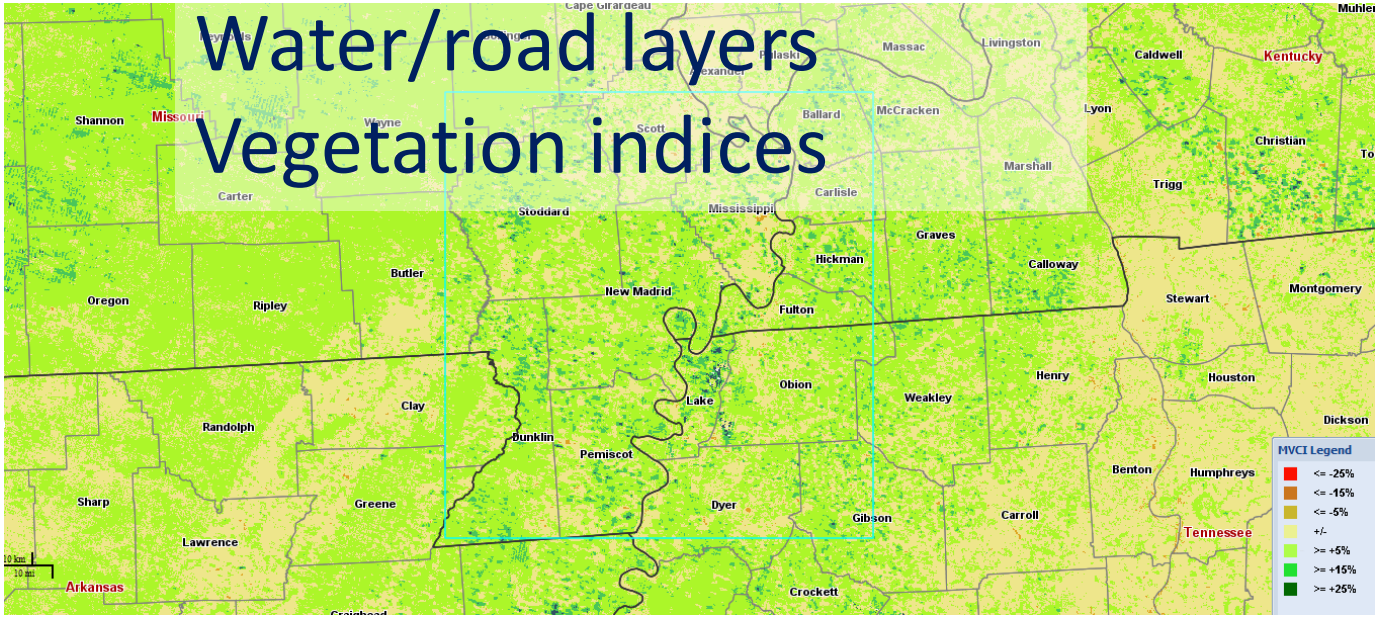


VegDRI: 07/29/13

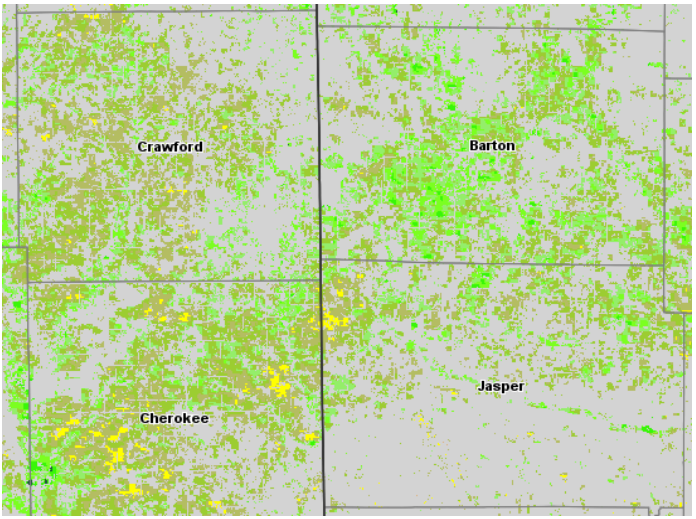
VegScape Layers/Products/Legends Tab



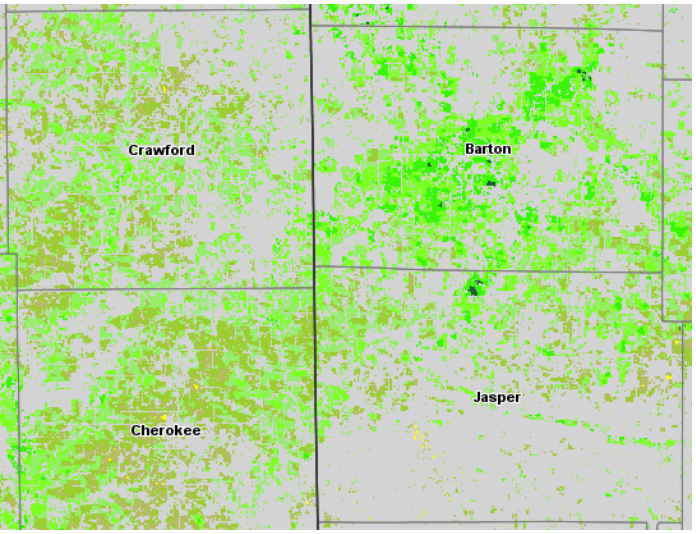




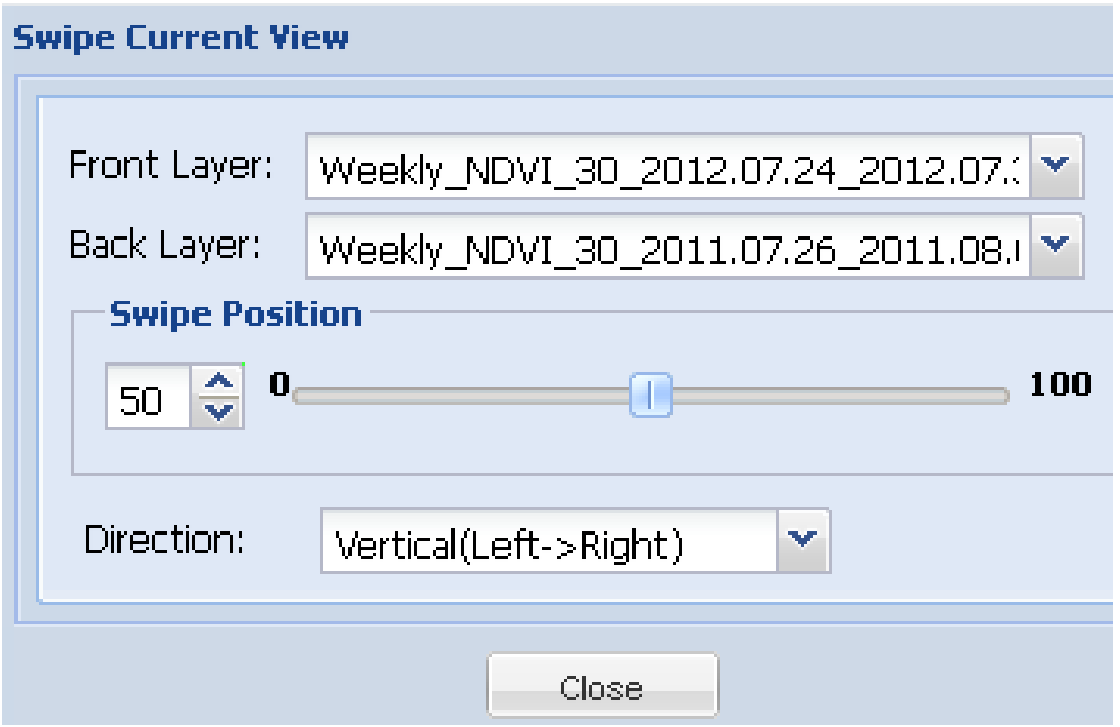
VegScape Swipe Function



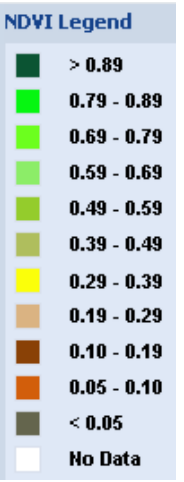
NDVI 07/24/12 – 07/30/12 Crop Mask

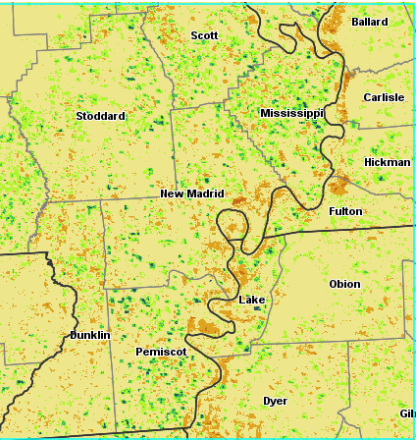


NDVI 07/26/11 – 08/01/11 Crop Mask

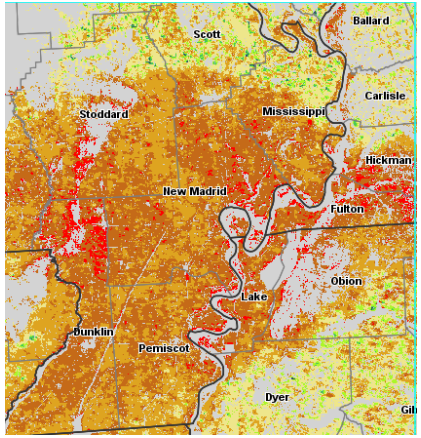


Swipe/fade widget back & forth
Vertical or horizontal motion

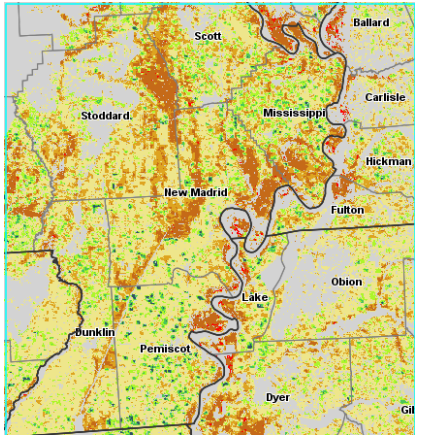




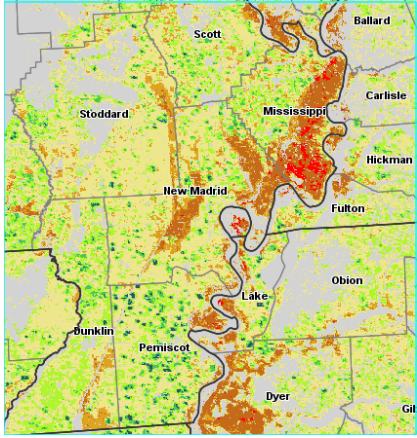
04/12-04/18/11



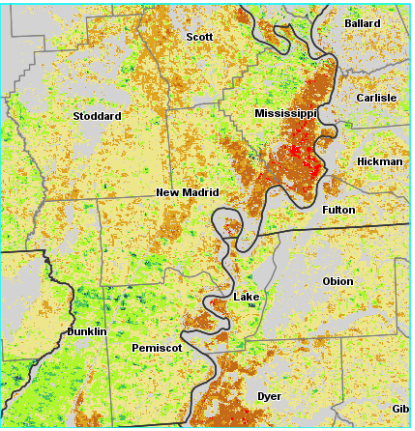
04/19-04/25/11



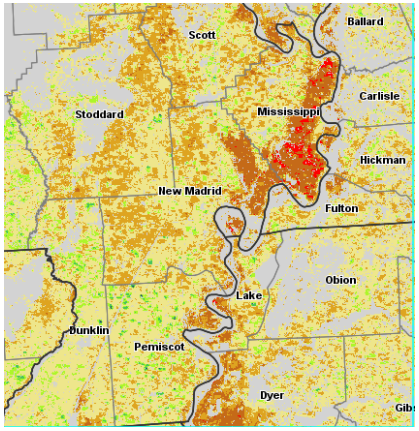
04/26-05/02/11



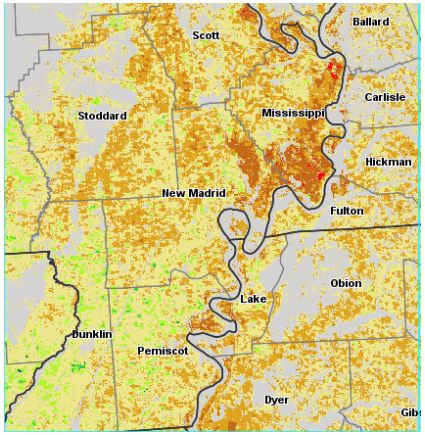
05/03-05/09/11



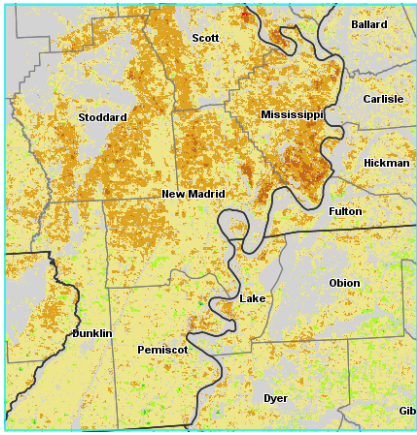
05/10-05/16/11



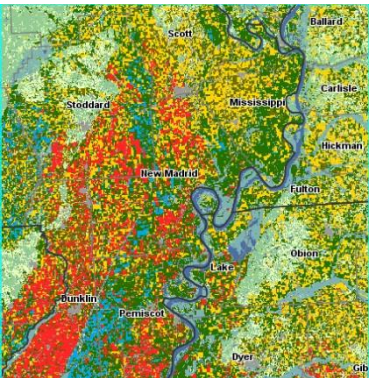
05/17-05/23/11



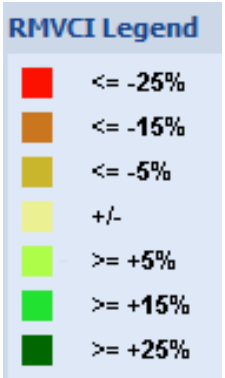
05/24-05/30/11



05/31-06/06/11

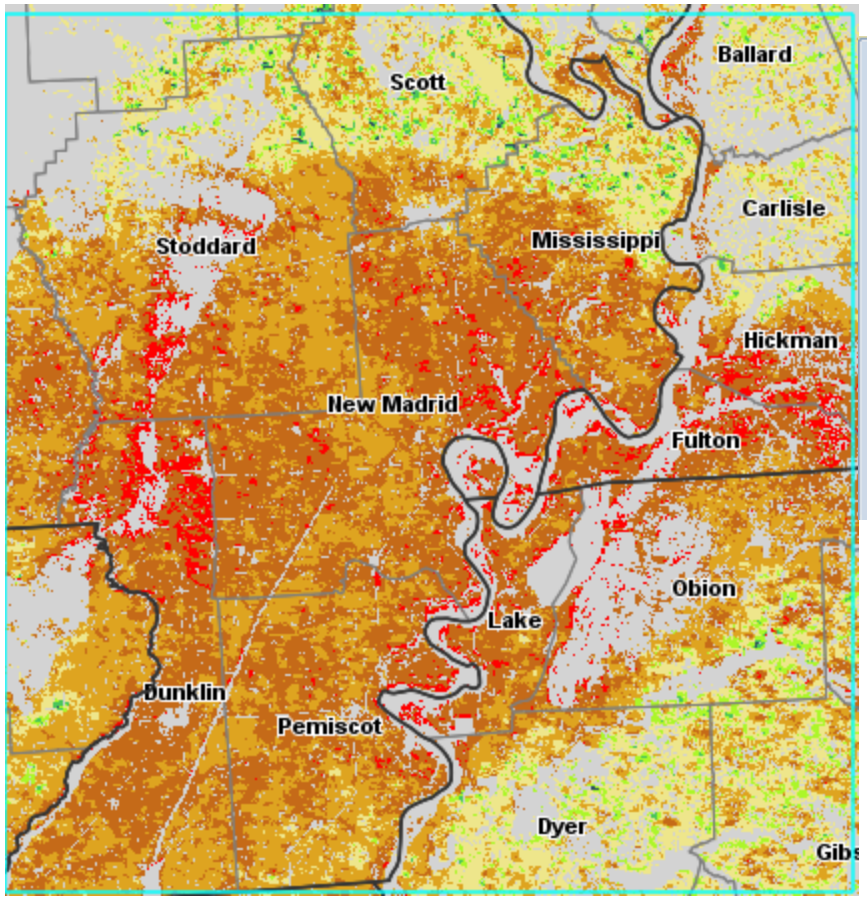


Cropland Data Layer



Time Series Profile 2011 Flood Missouri Bootheel Ratio Median NDVI (Median of 10 years NDVI)

RatioMedian VCI- Area of Interest Statistics



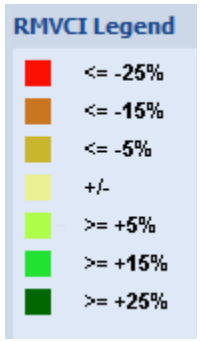
Weekly_RMNDVI_18_2011.05.03_2011.05.09 Data Layer Statistics for the Defined Area of Interest

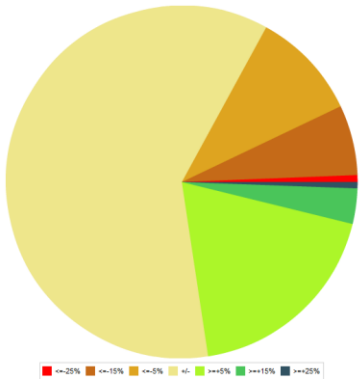
Note: Pixel and acreage counts are not official estimates.

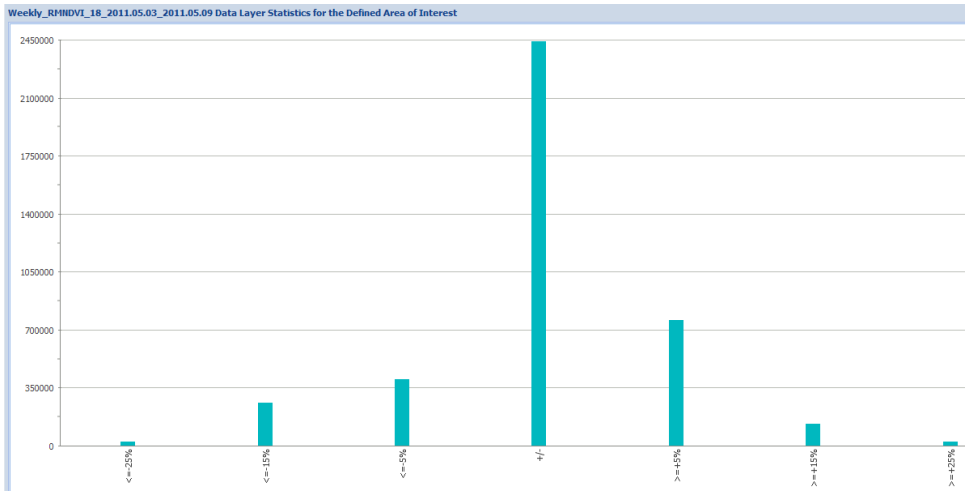
Value	Category	Pixel Counts	Acreage
0	<=-25%	1931	25606.6
1	<=-15%	19647	260535.3
2	<=-5%	30411	403274.7
3	+/-	184180	2442377.2
4	>=+5%	57280	759579.6
5	>=+15%	9910	131414.7
6	>=+25%	1765	23405.3
Total	**7**	**305124**	**4046193.4**

04/19-04/25/11

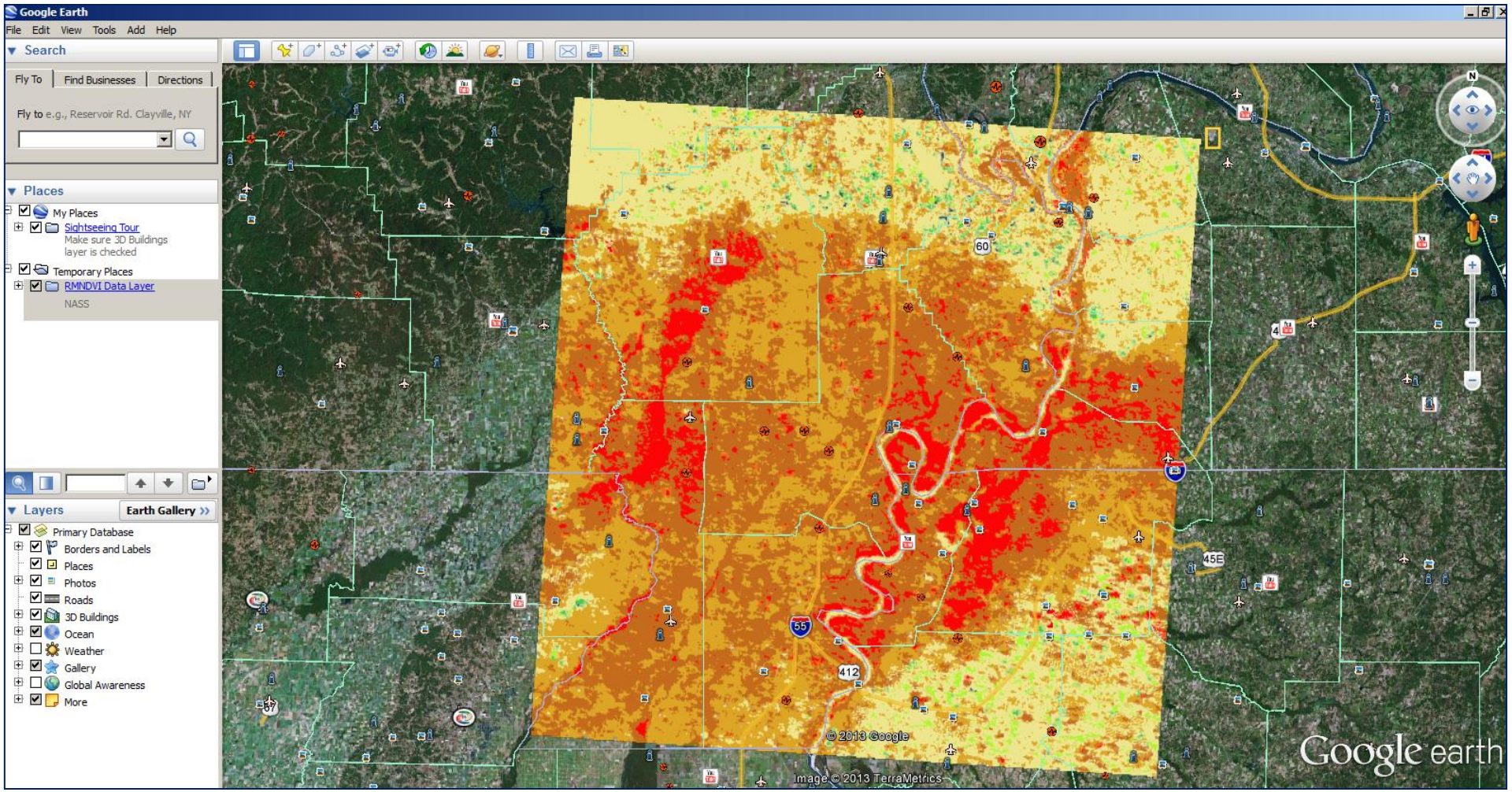
Quantify vegetative area condition







Web Mashup

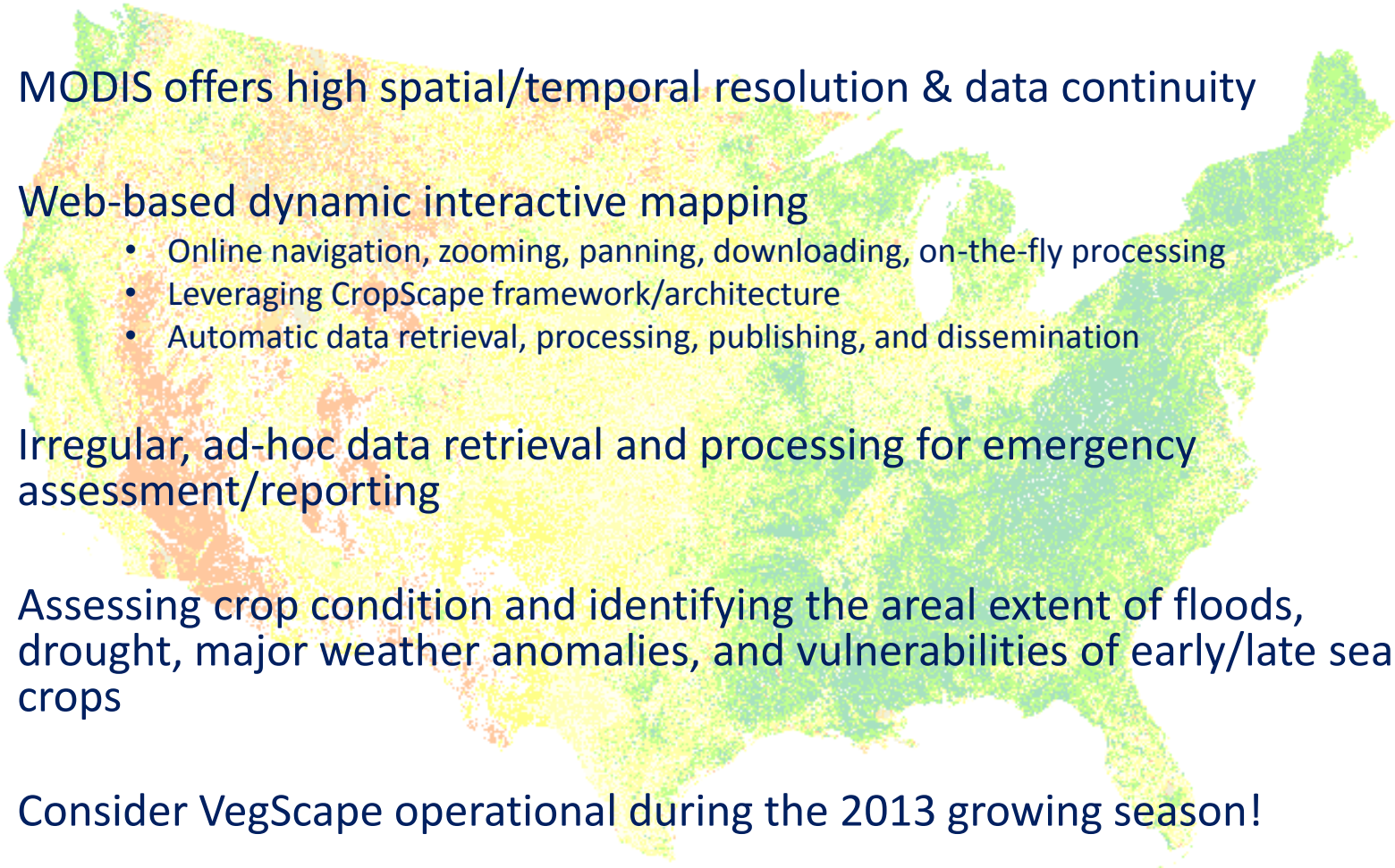


Download any selected index data directly into Google Earth

USDA

AGRICULTURE COUNTS NASS

VegScape Summary



- MODIS offers high spatial/temporal resolution & data continuity
- Web-based dynamic interactive mapping
  - Online navigation, zooming, panning, downloading, on-the-fly processing
  - Leveraging CropScape framework/architecture
  - Automatic data retrieval, processing, publishing, and dissemination
- Irregular, ad-hoc data retrieval and processing for emergency assessment/reporting
- Assessing crop condition and identifying the areal extent of floods, drought, major weather anomalies, and vulnerabilities of early/late season crops
- Consider VegScape operational during the 2013 growing season!


Questions?